TRAJECTORIES

PREMIERE ISSUE

TOMORROW'S NEWS TODAY!

"MIND-BODY" PROBLEM SOLVED?

by Robert Anton Wilson

THE PSYCHOBIOLOGY OF MIND-BODY HEALING
by Ernest Lawrence Rossi
(1988; W.W. Norton Co.; $25.95)

A cancer patient considered terminal is experimentally given a new anti-cancer drug and within days his tumors have shrunken to half their previous size. Febrile, bed-ridden and considered near death before the drug, the patient is now walking around the ward and chatting happily with everybody.

Obviously, the new drug was responsible, right?

Not at all. The patient--"Mr. Wright," as he was called by Dr. Philip West, who first recorded this case--was the only one who responded so favorably to the new drug, Krebiozen. Doctors eventually decided the chemical was virtually useless. It appears that Mr. Wright got better because he *believed* he would get better.

A South Seas shaman points a "death bone" at a tribesman who has angered him. The victim is given the best medical attention by sympathetic white physicians, and

see "Mind-Body," pg. 3

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--H.O.M.E.S. on Legrange
--Head Machines
--Kwantum Krazy Kat

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Δ **"Holistic Remedy"** by Arlen Riley Wilson pg.12

Dr. Linus Pauling

TRAJECTORIES INTERVIEW: DR. LINUS PAULING

Conducted by D. Scott Apel

DR. LINUS PAULING is both the most respected and most controversial scientist of our times. The only person ever to be awarded two Nobel Prizes in two different areas --for Chemistry in 1954, and for Peace in 1962--he is the recipient of some 40 honorary doctorates and hundreds of other prestigious awards from around the world, in areas as diverse as chemistry, medicine and world peace. He has published over 600 scientific papers and nearly 200 articles on social and political topics. His text ***The Nature of the Chemical Bond*** has been cited as one of the most influential science books of the century, and his classic ***No More War!*** was recently re-released in a 25th anniversary edition. The prestigious British magazine ***New Scientist*** has named Dr. Pauling--along with Sir Isaac Newton and Albert Einstein --one of the greatest scientists who have ever lived.

Today, at age 88, Dr. Pauling --whose name has become almost synonymous with "Vitamin C"--remains active, controversial, and on the cutting edge of modern scientific research. He graciously

see "Pauling," pg. 7

TRAJECTORIES

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To **Bob Bachtold,** our dynamic, lightning-speed "Computer Wizard," without whose many hours of expert help in designing, programming and maintaining the multi-dollar Permanent Press computer system, this news-letter would have been written out in longhand.

EDITORIAL

"THINGS TO COME"

Welcome to the premiere issue of Robert Anton Wilson's **Trajectories** Newsletter.

Trajectories is dedicated to the idea of *sane futurism*, and is designed for people more interested in creating the future than in worrying about it. It is our goal to keep our readers abreast of the latest breakthroughs in such areas as our future in space, nanotechnology, artificial intelligence, parapsychology, life extension, brain machines, the Aquarian Conspiracy and numerous other topics on the frontiers of science and technology.

This will be no dry, information-only newsletter, however. As readers of Robert Anton Wilson's books know, Bob has a genius not only for understanding complex, cutting-edge concepts, but for explaining them in an entertaining manner--and for intuiting the human implications of sterile science. So expect each item of interest to be colored by Wilson's witty way with words and his wry way of watching the world. And expect the unexpected: "a point of view" is all right for examining a universe, but it takes multiple points of view to examine the multiverse we live in.

Regular features in each issue of **Trajectories** will include:

* *A major piece by Robert Anton Wilson* -- This month's lead article, "Mind-Body Problem Solved?", for instance, is Bob's review of a new book on how neuropeptides act as mediators between "mind" and "body," an exciting new area of research in which hard science is answering--or eliminating--certain age-old philosophical questions. In future issues, look for more RAW material exclusive to **Trajectories**--including, perhaps, sneak preview excerpts from some of his "works in progress."

* *A **Trajectories** Interview* -- The eminent chemist Dr. Linus Pauling is featured this quarter; in future issues, look for interviews with such innovators, pioneers and futurist figures as *Dr. Tomothy Leary, Barbara Marx Hubbard* and others.

* *Tomorrow's News* -- A "newsletter within a newsletter," consisting of short news items you won't see in your local daily paper. "All the news that doesn't fit," is the motto of this paper: all the news that doesn't fit any acceptable scientific paradigm, that is.

* *Feminist Futurism* --**Trajectories** co-editor Arlen Riley Wilson offers her own unique perspective to each issue in this column; her poem "Holistic Remedy," both scathing and poignant, appears on page 12.

As **Trajectories** expands, we'll be adding new features too, including:

* *Feedback* -- A letters column featuring your input;

* *Interactive* -- a forum for debate among readers, and a chance to "Q & A" with RAW himself;

* *The Wilsonfinder* -- Where is RAW living now? What's he working on? When and where will his next book be available? Where will he be lecturing during the coming quarter? Everything you've ever wanted to know about RAW's activities, but didn't know who to ask; and finally,

* *More pages, more material (and more graphics)* -- Our intention is to expand **Trajectories** to include not only more cutting-edge thought, but frontline desktop publishing applications as well. Your suggestions in both areas are always welcome.

Webster's Dictionary defines "trajectory" as "the curve that a body... describes in space," and "a path, progression, or line of development." Our multiple **Trajectories** will hopefully carry us "off the beaten orbit," indicating the numerous paths that mark our progress in the development of an exciting, hopeful future: the light at the end of the reality tunnels.

D. Scott Apel, Managing Editor

"The neuropeptide system is the key to evolution."

--Charles Arthur Musès,
"Interface Between Quantum Physics and Bioenergetics,"
in **Self-Organizing Systems,** ed. by Yates; Plenum Corp., 1987

Mind-Body *cont'd.*

appears normal and healthy in ordinary tests, but within days he is dead. He seems to have died of the belief that "death bones" and curses can kill people.

A remarkable new book, ***The Psychobiology of Mind-Body Healing,*** by Ernest Lawrence Rossi, begins with careful documentation of these two cases and then cites extensive medical literature to show that such "magical" healings and slayings are far, far more common than we generally realize. If that was as far as the book went, it might leave a certain number of readers--e.g., those who really grok Ramtha and Shirley MacLaine--convinced that metaphysics has more to offer us than science.

But although Dr. Rossi--a professional hypnotist trained by the great Milton Erickson--has seen many similar cases in his own experience, he is not satisfied with vague explanations about "mind" miraculously taking command of "body." He wants to know what the hell is actually going on, concretely, in hypnotism, shamanism, Christian Science, and the ever-perplexing "placebo effect" illustrated by Mr. Wright. Astonishingly, Dr. Rossi seems to have found a large part of the answer.

But first, to show how commonly this mysterious "mind-body" link appears, let me cite some double-blind studies quoted by Dr. Rossi. In six careful double-blind studies, placebos proved 56 percent as effective as morphine; in nine double-blind studies, placebos were 54 percent as effective as aspirin; in three double-blind studies, placebos were 56 percent as effective as codeine. ("Effectiveness" in these studies was measured by decrease in pain.)

In short, for more than half of all patients, belief that one has received a pain-killer is just as helpful in reducing pain as an actual application of one of the three most common pain-killers would be.

My own books, especially ***Prometheus Rising,*** have numerous examples of how so-called "positive thinking" produces positive effects in such psychological phenomena as social relationships, general happiness, etc.; but everybody (in our society, at least) feels there must be something "spooky" happening when a belief system actually vanquishes physical pain and disease. This seems to be because our culture has never recovered from the Christian split of "soul" and "body" and the subsequent attempt to harmonize this with science by means of the unwieldy Cartesian philosophy of "the ghost in the machine."

As K. Bowers wrote in 1977, "The tendency to split etiological factors of disease into either psychic or somatic components. . .perpetuates, at least implicitly, a mind-body dualism that has defied rational solution for centuries. Perhaps what we need is a new formulation. . .that does not presuppose a formidable gap between the separated 'realities' of mind and body. One way of reformulating the question involves the concept of information. . . " (cited by Rossi, pg. 23).

The "mind-body" dualism has "defied rational solution," Rossi suggests, because any questions asked within that framework are scientifically unanswerable and probably (in the Wittgensteinian sense) meaningless. However, if we drop the "mind-body dualism" from our thinking and ask questions in terms of Information Theory, none of the data of placebo effects or faith healings seem intractible or inexplicable at all.

A basic concept of Information Theory is *transduction,* the translation of form from one information system into another. For instance, when I speak on the phone, the transmitter transduces my sound waves (speech) into the isomorphic system of electrical impulses; at the other end of the line--if I'm lucky and the phone companies are not screwing up again--the receiver transduces these electrical impulses back into sound waves which are heard as speech by the listener.

Similarly, while I sit here at my word processor, the console is transducing my words typed on the keyboard into binary units coded on the disk, and also transducing those binary units back into English words on the screen, so I can correct them at any time. Later--if I'm lucky and the computer is not screwing up again--the machine will transduce the bits on the disk into electrical signals to the printer, which will transduce them into words on paper--words you are now reading without asking meaningless metaphysical questions about how the ghostly "essence" of "wordness" can turn into electrical units and then turn back to something as "mental" as words again.

Quite similar processes of *information transduction,* Rossi shows, underlie the ability of the cortex of the brain (which contains "beliefs," along with other verbal codes) to send signals to the hypothalamus, the ancient little part of the back brain which regulates a variety of neurochemical and hormonal processes.

Among the most important

cont.'d next page

Mind-Body, *cont'd.*
chemical systems regulated by the hypothalamus appear to be the *neuropeptides*, including the now-famous endorphins, which act as natural pain-killers.

Neuropeptides have a strange duality about them which reminds me of the photons of quantum mechanics. Photons, as you have all heard by now, act like particles some of the time, but also act like waves some of the time. Neuropeptides just as Taoistically act like neurotransmitters part of the time and also like hormones part of the time. The little blighters never heard of Aristotelian either/or logic, I guess.

Acting like neurotransmitters, neuropeptides perform many functions in the brain, but seem most important in this context because they allow the opening of new neural pathways and "networks." This means, existentially, that with increased neuropeptide activity you are likely to have new ideas and probably also new perceptions. You might say neuropeptides are mild natural psychedelics. When new neural circuits form, this increased "creativity" (perception/conception) and its accompanying sense of novelty appears to be a large part of the "rebirth" process in most systems of non-medical healing.

When they leave the brain and start acting as hormones, neuropeptides interact with all the major systems of the body, including the immunological system. Increased neuropeptide activity, therefore, usually leads to increased "resistance" to disease and correlates with an inner sense of "feeling better" and becoming more hopeful.

It is probably no accident that the new mind-machines being used as pain-killers in many hospitals--and also as aids to deep meditation by many New Agers--all have definite effects on the hypothalamus and all seem to increase and maximize neuropeptide activity, especially in the brain and immunological systems.

A short review cannot do justice to the richness of detail and complexity of material handled so elegantly and coherently by Dr. Rossi. Some highlights seem worth mentioning, however:

* Those who respond best to placebos seem to be especially alert to synchronicity; those who respond least seem "rigid and stereotypic" in their thinking. It almost appears that a hard-core materialist would rather die than be cured by something that looks to him like "magic."

* Memory appears to be mood dependent. While happy, people remember more positive experiences; when sad, they remember more negative experiences.

* "Reassociating"--changing the categories of one's thought, or forming new reality-tunnels--seems as important in healing as the specific neuropeptide boost to the immunological system.

* The brain does not remember like a tape recorder or repeat like a parrot. "Reassociating" or reframing or updating goes on constantly; we remake our past continually. Rossi even suggests that what witnesses are expected to do in courtrooms--tell one story and stick to it--may be totally unnatural for the human brain.

* The traditional hypnotic suggestions to become more relaxed and close one's eyes serve to trigger a shift from the sympathetic ("outer-active") nervous system and beta-wave dominance to the parasympatheic ("inward-passive") nervous system and alpha-wave dominance. This again correlates with increased neuropeptide activity.

* It is becoming increasingly possible to reformulate and unify biology and psychology into the framework of Information Theory, with neuropeptides serving as the main transducers between such subsystems as the semantic circuitry (cortex), the autonomic nervous system and the endocrine and immunological systems. Materialist skepticism about "mind moving molecules" becomes irrelevant when we speak less metaphysically and more scientifically about transduction of information between brain circuits and body circuits.

* Since the neuropeptides are transmitted through virtually all the body fluids (blood, lymph, cerebrospinal fluid, etc.), as well as between neurons, the neuropeptide system acts more slowly but more holistically than the central nervous system.

* * *

One of the charms of this highly technical book consists in Dr. Rossi's practical turn of mind. Not only is every general idea in the text documented from recent neuroscience, but each is also illustrated with simple exercises the reader can use in order to experience directly the transductions being described.

If you sit still for a few moments, for instance, you will notice that one nostril seems less "open" or slightly more "clogged" than the other. Experiment every half hour or so and within 90 minutes you will find a time when the right nostril seems the "clogged" one. Lie down on your right side and passively observe your mental processes. If this works as well for you as it did for me, you will have a quicker and more thorough "right-brain" experience than with most techniques of meditation taught by Gurus. Any positive thoughts about health in that state seem likely to transduce into better health shortly. Try it and see!

Conversely, if you think you might lean toward too much right-brain dominance--the gaga state called being a "bliss ninny" in California and a "mere ecstatic" in Sufi literature--reverse the above. Wait until the left nostril

see "Mind-Body," pg. 11

Tomorrow's News

PSYCHIC SMITES CSICOP

Many who have observed the increasingly McCarthy-like tactics of CSICOP (Committee for Scientific Investigation of Claims of the Paranormal) will be cheered to learn that one victim has struck back successfully. **Ms. Noreen Renier**, a practising psychic who teaches at Rollins College and lectures at the FBI Academy, sued Northwest Skeptics (CSICOP's Oregon affiliate) for libel last year and won damages in the amount of $25,000.

The jury's verdict was upheld by the Court of Appeals of the State of Oregon on 3 February 1988. Meanwhile, another libel suit against CSICOP's Hawaiian affiliate is now before the Courts in the Aloha State.

MORE BAD NEWS FOR CSICOP

According to **Brain/Mind Bulletin,** in a study by John Barefoot at Duke University, a negative correlation was found between suspiciousness and longevity. In a sample of 500 older men and women whose health was recorded for 15 years, those who scored high on suspiciousness, cynicism and hostility were significantly more likely to die when compared to all others. The death rate of the suspicious remained higher than others when compared by age, by sex, by previous health and by diet and other lifestyle patterns.

In a previous 25-year study of physicians, also by Barefoot, those scoring high on hostility had 6.4 times the death rate of those with low hostility.

Another recent study by the Yale University Health and Aging Project included 1,139 men and 1,617 women, and determined that those with strong religious experience were less likely to become disabled or to show signs of clinical depression. This better health for the "religious" was equally true whether the respondents were members of organized churches or had their own private and inward mystic sensibility.

BRAIN/MIND BULLETIN

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"HOMES" ON LEGRANGE

The exciting new news about space colonies is now coming from the Scandinavian nations, which are trying to initiate a H.O.M.E. project that will enlist the cooperation of both America and Russia.

Some years ago, Dr. Timothy Leary proposed the name "H.O.M.E."--an acronym for **H**igh **O**rbital **M**ini-**E**arths--for space colonies in the Legrange area near the moon. Such colonies, originally proposed by Dr. Gerard O'Neill of Princeton, have drawn wide support from many diverse groups, and the L5 Society (named after Legrange Point 5, the optimal colonization site) has achieved a great deal of publicity for this approach to increasing our energy resources and widening our future options. Unfortunately, the L5ers lost much support and inner morale when the group split violently over opinions on the SDI program--the "Star Wars" of the popular press.

The latest peace-oriented space colonization project comes to us from Norway, Sweden, Denmark and Holland, and is the brainchild of Forum 2000, a group of Scandinavian Futurists led by Sven Bjork. Called the "Scandinavian Initiative," this scenario will be officially launced in the summer of 1990 at a conference in Oslo, Norway. The conference will feature such noted speakers as astronomer Dr. Carl Sagan, director Stanley Kubrick, anthropologist William Irwin Thompson, economist Hazel Henderson, **Trajectories** co-editor Robert Anton Wilson and many others, including a team of Russian and American astronauts.

As Sven Bjork of Forum 2000 has written, "Such a high-tech venture would tend to excite the imagination of scientists, entrepreneurs, politicians and others--and would invite dialogue, interaction and cooperation. . . .Hence, the pros and cons of SDI will not be the issue. But if successful, such a joint USA/USSR space program would naturally tend to draw the energy away from images of tribal warfare in space. It would also tend to reduce the present mutual paranoia and political game-playing."

The Scandinavian nations seem the logical place from which to launch such a venture, as they are not regarded with hostility by the rulers of either the USA or of the USSR, and have often successfully served as negotiator in conflicts between these "Superpowers."

Those wishing to be in Oslo for the 1990 conference, or who merely desire to be kept informed of the progress of the Scandinavian Initiative, should write to: **Sven Bjork, Forum 2000, Postboks 5140 Majorstua, 0301 Oslo 3, Norway.**

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KRAZY KAT KOMES KLOSER

Recent experiments in physics have undermined the familiar assertion that the bizarre nature of the quantum world cannot have equally bizarre effects on the macroscopic world. It now appears that, on the contrary, the notorious quantum indefiniteness can directly cause a similar indefiniteness on higher levels.

Erwin Schroedinger, in *Der Naturwissenshaft,* Vol. 23, 1935, devised his infamous and provocative *gedankenexperiment* which seemed to lead to the conclusion that quantum uncertainty can create a cat that is both dead and alive at the same time. All you have to do is arrange to have the cat in a box with a poison

continued on next page

gas pellet that will be exploded by a quantum decay process, see? Until you open the box, the cat's liveness or deadness depends on pure quantum uncertainty, and the statements "the cat is dead" and "the cat is alive" have the same truth value, namely 1/2, or 50 percent.

Physicists of the period (including Schroedinger) regarded this as absurd, but it did bring to the forefront the awe-inspiring problems of trying to deduce just how the deuce quantum wobble relates to our seemingly stable macroscopic world. In the 1950s, Everett, Wheeler and Graham of Princeton proposed, somewhat whimsically, that the quantum instability *does* effect our level of being: that there is not one universe but many, in some of which the cat is dead and in some of which it is alive. (But then I am both dead and alive as I write this... depending on which universe you are looking at.) This seemingly surrealist view has increasingly won the acceptance of the bolder and younger physicists of the 1970s and '80s.

Now, in experiments repeated by several groups of investigators, quantum wobble has clearly been shown to create a similar uncertainty on the level of magnetic flux in a superconducting ring--which contains 10^{23} electrons and is, hence, regarded by physicists as "macrocosmic."

Such researchers as Voss and Webb at IBM Research Center, Devoret at Berkeley and others have demonstrated that the flux in the superconducting ring has an uncertainty that cannot be explained by macrocosmic factors and can only be explained as the resultant of quantum fluctuations involving uncertainties of electron localization around a Josephson junction. The electrons remain nonlocal in Bell's sense, and the flux, as it were, cannot "decide" what its own value should be. The flux thereby becomes measurably as indefinite as a quantum system. Like Schroedinger's flexible feline, it is what it is, but it is also what it isn't.

These experiments are described in "The Reality of the Quantum World" by Abner Shimony in the January, 1988 issue of *Scientific American.* Do we hear the sound of Schroedinger's *verdammte* cat yowling in the distance, about to leap forward and drag us into as many multiple realities as a Joyce (or Wilson) novel?

Meanwhile, we leave it to the Jungians to explain how those two 23s snuck into this simple scientific discussion...

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HAVE FUN WITH YOUR NEW HEAD

The first generation of mind-training machines were called "biofeedback devices," and seemed a dramatic evolutionary breakthrough in the early 1970's. Less than two decades later they seem obsolete, as the Second Generation of Head Hardware--including many new varieties of brain-tuners and brain-trainers--is becoming widely available and widely used.

We intend to keep our readers informed of scientific research in this field in future issues of **Trajectories;** at present, the best general guide to the field is Michael Hutcheson's ***Mega-Brain*** (Ballentine Books, $4.95).

The two major conclusions that have emerged at this time are that these machines, although often working on different principles, all encourage the brain to generate more neuropeptides, and that many users claim an impressively wide variety of mental and physical benefits--which, alas, have not yet been totally verified scientifically.

Below are some of the more interesting machines now available:

Δ **The Endo-Max.** Consists of a basic unit that feeds various frequencies into the brain by electrodes attached to the mastoids, together with four tapes giving eight basic frequencies that many have found beneficial. Included are frequencies for endorphins, for mood elevation, for sedative effects, and for quick energy. New tapes will be added, the manufacturer says. Price: $212 (plus 6% tax). Contact: Mega Dynamics, 866 Huntley Dr., Los Angeles CA 90069.

Δ **The NeuroPep.** Stimulates the brain with various light and sound frequencies, controlled by master tapes. The manufacturer claims this gizmo can do everything done by the more expensive Synchro Energizer. New tapes will be added continuously, they say, and NeuroPep is promoted as a new artistic medium for light and music as well as a brain-trainer. Price: $299 (plus 6% tax). Contact: Mega Dynamics (address above, under Endo-Max.).

Δ **The Synchro Energizer.** Briefcase-sized unit includes headphones and goggles which pulse sound and lights in synchronization. EEG studies show that brainwave activity replicates rhythm.

Δ **Alpha-Stim.** Electrodes attached to earlobes send extremely low powered electrical current directly into the brain, simulating the nervous system's own current, and "tuning" the brain to preset frequncies, including deep relaxation, heightened mental and memory performance and euphoria.

Δ **The Pulstar.** Electrodes in a headband are worn while operating theis book-sized device, which the inventor claims "subliminally teaches control of brain-wave frequency by propagating an an electronic signal through the brain."

Δ **The Brain Tuner.** Two electrodes attached to acupuncture points beneath the earlobes plug into a unit the size of a pack of cigarettes; users report euphoria, reduced stress and improved sleep, concentration, memory and energy.

Δ **Alphatronic III.** Two electrodes attach to a matchbook-sized unit which uses electrical stimulation even weaker than the nervous system's own to subtly fool the brain into thinking the stimulation is part of the body's natural processes. Is said to reduce anxiety and blood pressure, and enhance meditation and concentration.

Δ **Mood Pacer II.** Broadcasts pulsed EM fields, so no electrodes are necessary. Only one frequency available, but this is a "catch-all" frequency with multiple beneficial results.

Δ **AlphaPacer II.** Entrains the brain combining all of the above approaches: electrical stimulation through electrodes, pulsed EM fields, pulsating sounds and strobe lights, all attuned to the same frequency. Can be used to induce alpha or theta states.

For further information, write:

MEGABRAIN
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The article that

CSICOP

doesn't want YOU to read!
"A Skeptical Look at the Skeptical Inquirer,"
by John Bryant. $1.50 from
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St. Petersburg Beach, FL
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Pauling, *cont'd.*
took time out from his busy schedule to talk with **TRAJECTORIES** Managing Editor D. Scott Apel in his office at the Linus Pauling Institute of Science and Medicine--a maze of offices housed in a nondescript warehouse near the Stanford campus in Palo Alto, California.

TRAJECTORIES: Can you give us an overview of the studies on the curative or preventative powers of Vitamin C? I've heard you mention that at least 14 different double-blind studies have been done that indicate its efficacy.

DR. PAULING: In my new book I list 16, because a couple of others have come out. These relate to the common cold, and they're controlled trials, most of them double-blind, randomized trials, involving rather small amounts of Vitamin C. Usually one gram per day--1000 mg per day. Four of them used considerably less: 200 mg in one or two. The average amount of illness among the Vitamin C subjects was decreased by 34 percent. That's the *average* decrease for the 16 studies. The maximum was about 80 percent, I think. And there were a couple others of 78 and 63 percent.

"There's no doubt that Vitamin C controls colds."

TRAJECTORIES: So there's no question that this is statistically significant, then, even with the wide range.

DR. PAULING: Yes. Different populations, different circumstances; so different results are not surprising. And there were different amounts of Vitamin C. Illness declined 40 percent for the one gram a day group, and 32 percent, as I recall, for the studies that were only about 200 milligrams a day.

TRAJECTORIES: Then there's a direct correlation between the amount taken and its effectiveness, too?

DR. PAULING: That's right. And of course I say that one gram a day isn't enough; that adults perhaps ought to take three or four grams a day. Especially if you start feeling that you're coming down with a cold, take two or four or six grams. If you feel like you have some symptoms, do that immediately. If you still have symptoms an hour later, take *another* slug, and just keep taking it until you stop the cold. Almost every worker in this field--there are a few who hold out still--but almost every worker in the field says Vitamin C may not cut down the number of colds very often, or stop the viral infection, but it almost always decreases the number of signs and symptoms, and the severity. There's no doubt that Vitamin C controls colds.

The other big argument is about cancer. My associate, Dr. Cameron, who is the Chief Surgeon of a 400 bed hospital in Loch Lomanside, Scotland, treated several hundred patients with advanced cancer, usually by giving them 10 grams of Vitamin C a day, all of their lives, starting at the time when they were pronounced terminal, or untreatable--or as soon as he could get them onto it. He usually gave it to them by intravenous infusion while they were in the hospital, but started it by mouth, too, and then continued by mouth until they died, or until the present time. Some of these terminal cancer patients of 14, 15, 17 years ago are still alive. One that I've gone to see several times was expected to die in four months in the spring of '72, I think. And she's still alive, 16 years later, taking her Vitamin C. And in general, they feel better. They lead a good life. They have energy. They don't feel miserable, but feel good, lively. Their appetites come back; they don't suffer from anorexia. And on the average, the mean time of survival is several months longer for the terminal cancer patients.

Perhaps more important, as Cameron says, a few fortunate individuals--about 10 percent--just live on and on, for five years, or ten years, or 16 years, on the Vitamin C

Dr. Morishiga, in Japan, became interested when I went to Japan and talked about this, and invited me to his hospital. He has repeated these observations and gets essentially the same results with Japanese patients with cancer who take 10 grams of Vitamin C or more--often he gives them more--compared with those who got no Vitamin C, or only a little Vitamin C.

TRAJECTORIES: So you're moving away from anecdotal evidence into more controlled studies and repeatable experiments?

DR. PAULING: Well, it's difficult to carry out a controlled trial. I talked with Cameron in 1974 there in Scotland about doing a randomized control trial. He wouldn't do it. He said his ethical principles would not permit him to withhold Vitamin C from any of his patients. But in the same hospital were doctors who were *not* using Vitamin C for the same kinds of patients, and there was a sort of randomization in the process of admitting and assigning patients. On the days when Cameron was on duty and a patient came in, it was his patient from then on. If another doctor was on duty, then it was the other doctor's patient. So they were randomized in that way. Even though it wasn't a double-blind trial, the patients that came in for these other doctors had the same mortality that they'd been having the preceeding ten years. But Cameron's patients had much lower mortality.

"With cancer, there's no doubt that Vitamin C has much value..."

It was like Semmelweis, in Vienna. 15 percent of the women who came in to give birth died of puerperal septicemia. Semmelweis

continued next page

Pauling, *cont'd.*

said that the doctor was carrying the infection, and required his interns to wash their hands in sodium hypochloride solution before they went in to see a patient, and in between patients. The other doctor, the head of the department, refused to do that. So during the next year, the head of the department had 15 percent mortality, and Semmelweis had *no* mortality--and got fired!

So with cancer, there's no doubt that Vitamin C has much value, as Dr. Cameron and I say, *as an adjunct to* appropriate conventional therapy. We say, don't give Vitamin C as a *substitute* for appropriate conventional therapy, but *as an adjunct to* conventional therapy, *if ihe therapy is appropriate.* And by that we mean if it is known that the conventional therapy benefits patients with that kind of cancer, then they should get it.

TRAJECTORIES: Your opponents usually cite a study done by the Mayo Clinic, but I believe you have objections to that particular study. Isn't that correct?

DR. PAULING: The Mayo Clinic study was carried out with a 100 patients with advanced colorectal cancer, considered to be untreatable. And in their paper, the Mayo Clinic doctors said they were justified in withholding chemotherapy because this kind of cancer doesn't respond to chemotherapy. Before their trial was over, they had given chemotherapy to 58 of the 100 patients, even though they know it was not appropriate. And, of course, chemotherapy makes the patient miserable--if he or she is not taking Vitamin C. Vitamin C helps control these side effects of nausea and hair falling out, and so on. So every doctor "knows" that the Mayo Clinic showed that Vitamin C has no value against advanced cancer. That's what they say in their paper. In that paper, they report that they gave 50 patients 10 grams of Vitamin C a day. We're skeptical about that, but that's what they say. And the controls got a placebo. And there was no difference. They say. They gave the Vitamin C for a median time of two months and a half and then stopped it. None of their patients died while they were getting the Vitamin C. They died after it was stopped. Dr. Cameron and I had said in our book, you shouldn't stop Vitamin C for cancer patients; it may be dangerous. They began dying rapidly when the Vitamin C was stopped.

TRAJECTORIES: The conclusion you would draw from the Mayo Clinic study, then, is not that it's dangerous to give Vitamin C to terminal cancer patients, but that it's dangerous to stop.

DR. PAULING: Yes. It's dangerous to *stop* giving it. In fact, they had no justification for their conclusion. They might have said, "It is our conclusion that giving Vitamin C for two months and a half to patients with advanced colorectal cancer has no value." Even that might be debated, but they might have said that. But just to say, "Giving high-dose Vitamin C to patients with advanced cancer"--all kinds--"has no value," is just completely improper, you see? We haven't been able to get the New England Journal of Medicine to publish our letters pointing these things out.

"The American Medical Association says that a 'quack' is a person who says he has something that's good for you no matter what's wrong with you. By that definition, I'm a quack."

TRAJECTORIES: The common cold, cancer, longevity. . .you claim they are all subject to manipulation by Vitamin C. Some of the criticism you've come under is this proselytization of Vitamin C as a panacea. Do you think this has affected its acceptance in the medical community?

DR. PAULING: The American Medical Association says that a "quack" is a person who says he has something that's good for you no matter what's wrong with you. By that definition, I'm a quack.

TRAJECTORIES: Would you go so far as to say that Vitamin C. is some sort of immune system builder?

DR. PAULING: Oh, yes! That's right; we *do* say it, and point out in what ways it's known that Vitamin C stimulates what aspects of the immune system. You have evidence about infectious diseases, from Dr. Morishiga--who began getting interested in Vitamin C about the same time I did--and from Dr. Cathcart, here in Mountain View. In my book ***How to Live Longer and Feel Better,*** I give arguments and some evidence about heart disease, especially that high-dose Vitamin C cuts down the cholesterol level, and everyone believes--all the authorities agree, I think--that there's a very good correlation between cholesterol level and incidence of death from heart disease. So probably the main thing that Vitamin C in the high doses does is to potentiate the body's natural protective mechanisms--the immune system and other protective mechanisms.

TRAJECTORIES: Can you tell us a little about your latest studies?

DR. PAULING: Well, among other things, I'm working on the high temperature copper oxide superconductors. They were discovered only two or three years ago, by two men in an IBM laboratory in Switzerland--

TRAJECTORIES: --and within a few months even high school students were recreating their experiments with materials costing a few dollars.

DR. PAULING: That's right!

continued next page

Pauling, *cont'd.*
There was great interest among hundreds--probably thousands--of solid state physicists and metallurgists and others working on this problem. I'd published a paper on superconductivity 20 years ago, in which I discussed two classes of superconductors. So I wrote a paper which was published in August, 1987, on the theory of these high temperature copper oxide superconductors, and I wrote another one recently expanding this theory. It's based on my theory of metals, called the resonating covalent bond theory of metals, which I formulated in 1938 and had written about at considerable length. So several other people have now published papers on a resonating covalent bond theory of superconductors. They don't say exactly the same thing that I say--I don't think they understand these matters so well. You should remember that I've been thinking about these things since. . .well, 1921, anyway, when I was working as an undergraduate on a research problem that I had invented on my own, dealing with the nature of metals--iron, in particular. Actually a couple years before that, when I had some courses in metallurgy. So it's been--how long?--*69 years* that I've been thinking about this.
TRAJECTORIES: I'd say that gives you a pretty good edge.
DR. PAULING: Well, I have a tremendous body of knowledge about them. I've just formulated a new idea about how to get still *higher* superconducting temperatures from certain compositions.
TRAJECTORIES: At any kind of temperature that might be easily available?
DR. PAULING: Perhaps even *room* temperature.
TRAJECTORIES: That would revolutionize the world.
DR. PAULING: Yes. But I don't know that it will *work*, you know. I'm in the process of trying to get some company interested in checking up on it. So this is what I've been doing most recently.
TRAJECTORIES: Have you been involved lately in any active anti-war work?
DR. PAULING: 30, 35 years ago, I was devoting half my time to work for world peace, giving hundreds of speeches--that was perhaps the main activity--but writing hundreds of articles, too, and participating in many demonstrations--leading peace walks, and things of that sort. I now pretty much restrict myself to signing statements. I just signed one that was a full page in the ***New York Times*** in favor of withholding all aid from Israel. I believe in peaceful resolutions of problems.
TRAJECTORIES: How effective would you say your work for world peace has been?
DR. PAULING: Well, the Nobel Committee felt it might well be that there wouldn't have been the bomb test treaty if I hadn't been making up petitions and giving all these lectures and writing my book and so on. It may be that they're right; nobody knows, how much effect this had. But the Chairman of the Nobel Committee said he believes that if there hadn't been someone doing what I did, this treaty would never have been made. They awarded the Nobel Peace Prize to me on the day that treaty went into effect: the 10th of October, 1963. There's probably a more direct connection between my activities and the bomb test treaty than anything else.
TRAJECTORIES: That's a pretty good connection. . .
DR. PAULING: Other people have been more effective in keeping the peace movement going. There are hundreds of people who work pretty vigorously in the peace movement now.
TRAJECTORIES: What would you suggest to average citizens who really don't have the prestige to carry a lot of weight or the time to devote full-time to peace work? How can they make a contribution of importance?
DR. PAULING: Well, I say, *do what you can.* Don't worry about how effective your contribution will be. Just go ahead and do it. Write letters to the editors of newspapers supporting peace activities; whenever there's a demonstration, if it's possible for you to go participate in the demonstration, do so; especially, vote for peace candidates in local elections, regional and state elections and national elections. Try to get candidates to express themselves on the issue of use of military might as compared with working for world peace and negotiating solutions to problems. So that's my recommendation to people: Do *something*. Don't think that you're not going to be of any value. You might be of great value. Perhaps your contribution will just be of small value. But altogether, if everybody is doing this, it'll be effective.
TRAJECTORIES: Thank you, Dr. Pauling. Δ

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PROLONGEVITY

* A poll of 227 scientists by the Lou Harris organization reported that one-third of those interviewed expected lifespans of over 100 years to be normal for both men and women within the next twelve years.

* A study of longevity in Great Britain, recently announced on the BBC, discovered that the number of people over 100 years old increased from around 300 in 1976 to over 3,000 only ten years later in 1986.

* Longevity researcher Durk Pearson declared on a recent "Donahue" TV show that average lifespan has increased much faster in the U.S. in the last decade than he had expected. Pearson confesses to be puzzled by the data.

Three possible theories about this longevity upsurge:

Rising expectations. The idea of greatly extended lifespan was "radical" when people like Dr. Timothy Leary and Alan Harrington started discussing it 15 years ago, but now has been publicized in all media (even the *National Enquirer*). Many people may be living longer because they have higher hopes and fewer anxieties. (See our article "Mind-Body Problem Solved?" in this issue.)

Social Security. (I include this not only because it may be true, but because it will certainly annoy my Libertarian friends.) Many people may be living longer due to Social Security, for the following reasons: 1.) They are less likely to starve or suffer debilitating malnutrition. 2.) They are able to pay medical bills. 3.) They worry less and feel less dependent on their children than seniors did before Social Security. 4.) They can afford a little more fun and recreation.

The "L-Pill" is here--somewhere. In 1973, Dr. Timothy Leary boldly predicted a life extension drug, or "L-Pill," would be found by 1980. Maybe one or more of the alleged longevity compounds (all condemned as worthless by the AMA) currently in use by heretics actually has the rejuvenating effects claimed by its advocates, and serves at least as a precursor of the true L-Pill. Could it be Vitamin C (as persuasively argued by Dr. Linus Pauling in this issue's **Trajectories Interview?**) Or maybe Vitamin E? Ginsing? Something else? A synergetic combination of many of the popular anti-aging compounds? The older I get, the more this seems worth more research. . .

--R.A.W

PROLONGEVITY II -- THE SEQUEL

A small group of biologists, statisticians and population experts met at U.C. Berkeley last April 29 and 30 to discuss the scientific and social repercussions of the recent surge in life expectancy, at a workshop sponsored by the National Institute on Aging.

Among the trends mentioned:

* Life expectancy in developing countries has reached unexpected heights, and is expected to continue to increase. White American men can now expect to live to age 72; white American women to age 78.

* In 1970, the average age in the U.S. was 32.2 years; in 1980, 34.1. (This may not reflect a rise in life expectancy, but rather the *en masse* aging of the large Baby Boomer population, pushing up the national average by sheer force of numbers.)

* In 1888, the chances of living to 100 in this country were one in 400; a century later, we have a one in 87 chance of reaching our century mark.

The bad news:

* According to Samuel Preston, director of the Population Study Center at the University of Pennsylvania, even though more people are living longer, the maximum age seems to be holding steady. "There are more people living to 100," he says, "but there are no more people living to be 115. So the absolute span of life. . .does not seem to be increasing."

* George M. Martin, a pathologist from the University of Washington, calculates that up to 7,000 genes may be involved in aging. If this is an accurate figure, controlling the symptoms of old age will be very difficult.

* Biologists and gerontologists can't agree among themselves what "normal" aging is--or how it works. Nor can they agree on whether human life span can be extended indefinitely, or if our species has a "characteristic span."

The pessimists may have to change their tune, however, thanks to recent successes in nearly doubling the life spans of such lab animals as fruit flies and lab mice. --DSA

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Mind-Body, *cont'd.*

feels more clogged, lie on your left side, and observe how naturally you move into analytical and linear modes of perception/thought.

Rossi concludes that the brain constantly seeks "the high information value of an improbable event." Information Theorists have known since Shannon that such high information is mathematically reciprocal to negative entropy. Improbable events (or interpretations) counteract the tendency of material systems to "run down" toward entropy and formless chaos, i.e., that Fundamentalist Materialist equivalent of the Apocalypse, the "heat death of the universe." Information Theory suggests that information as negative entropy runs upward against this Doomsday scenario.

In other words, all our reframing, reassociating, "creativity," etc., amount to a continuous search to feed the brain more information: to decrease mental entropy, and thereby decrease physical entropy. This concept ties psychology more intimately to information theory than ever before, and might also explain the frequent link between boredom and illness (and between synchronicity and placebo effectiveness). Rossi's speculations on this crucial issue remarkably echo and expand quantum physicist Erwin Schroedinger's famous insight that life may depend upon its own ability to generate and regenerate negative entropy. Bucky Fuller expressed the same idea by saying that the human brain seems designed to oppose entropy by acting as an improbable local problem-solver.

If you've ever wondered how something as ghostly as "mind" can influence something as "gross" as, say, the lower intestine, Rossi should help you understand why that metaphysical (and meaningless) question can never be answered, and why it is more profitable to ask operationally and existentially how the semantic system in the cortex influences the endocrine and other systems that control the intestine.

Perhaps the final word I can offer on this wonderful book is simply to say that I have "understood" these general principles for over 20 years, but only in a "right-brain" way: vaguely and incoherently. After reading Rossi, I begin to feel that I really have started to understand neurosomatic wholeness in a clear, crisp and scientific manner. Δ

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HOLISTIC REMEDY

This is the world that man made.
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The world that man made.
This is the doctor prescribing the pills
That cured the ills that plagued
The world that man made.
These are the plants and labs and mills
That manufactured all the pills the doctor
Gave to treat the ills that plagued
The world that man made.
This is the banker with tellers and tills
That backed the plants and labs and mills
That manufactured all the pills the doctor
Gave to treat the ills that plagued
The world that man made.
This is the general with trumpets and trills
Who made the war that saved the bank that
Backed the plants that manufactured all the pills
The doctor gave to treat the ills that plagued
The world that man made.
Here is the mother all forlorn
Whose one and only child was born
To die in the war the general made to save
The bank that backed the plants that made
The pills the doctor gave to treat the ills
That plagued the world that man made.
This is the angel who blew his horn
To comfort the mother all forlorn
And fired the general and closed the banks
And shut the mills and scattered the pills,
Retired the doctor and cured the ills
And ended the world that man made.

--Arlen Riley Wilson